



Needlenose pliers are used to hold or bend small objects. Locking pliers (**Figure 22**) are used to hold objects very tightly. They have many uses, ranging from holding two parts together to gripping the end of a broken stud. Use caution when using locking pliers. The sharp jaws will damage the objects they hold.

Snap Ring Pliers

Snap ring pliers (**Figure 23**) are specialized pliers with tips that fit into the ends of snap rings to remove and install them.

Snap ring pliers are available with a fixed action (either internal or external) or convertible (one tool works on both internal and external snap rings). They may have fixed tips or interchangeable ones of various sizes and angles. For general use, select a convertible-type pliers with interchangeable tips.

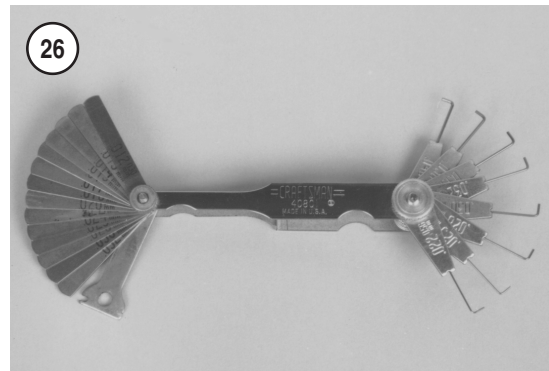
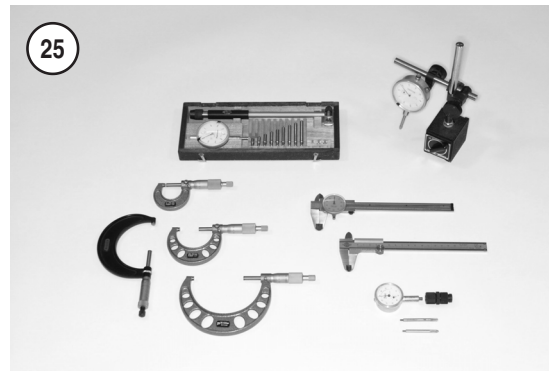
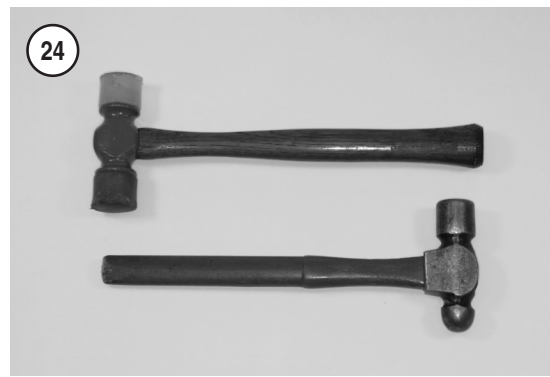
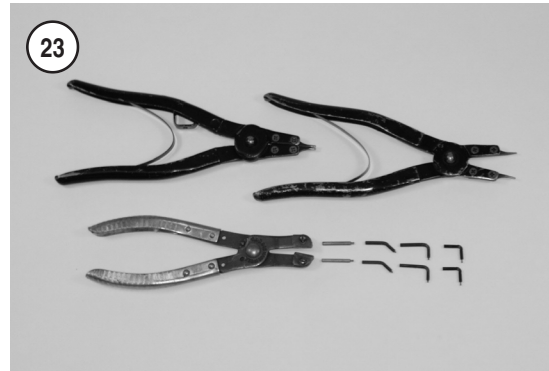
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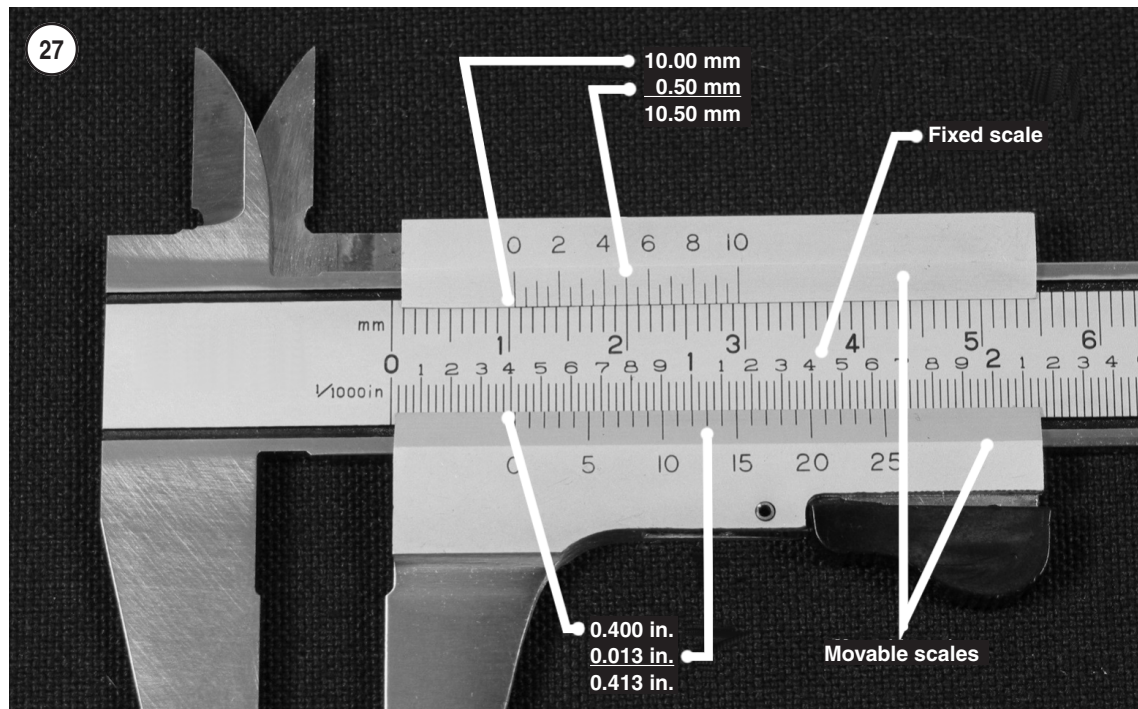
Always wear eye protection when using snap ring pliers. Snap rings can slip and fly off during removal and installation. Also, the snap ring plier tips may break and fly off.

Hammers

Various types of hammers (**Figure 24**) are available to fit a number of applications. A ball-peen hammer is used to strike another tool, such as a punch or chisel. Soft-faced hammers are required when a metal object must be struck without damaging it. *Never* use a metal-faced hammer on engine and suspension components. Damage will occur in most cases.

Always wear eye protection when using hammers. Make sure the hammer face is in good condition and the handle is not cracked. Select the correct





hammer for the job and make sure to strike the object squarely. Do not use the handle or the side of the hammer to strike an object.

PRECISION MEASURING TOOLS

The ability to accurately measure components is essential to successful service and repair. Equipment is manufactured to close tolerances, and obtaining consistently accurate measurements is essential to determining which components require replacement or further service.

Each type of measuring instrument (**Figure 25**) is designed to measure a dimension with a particular degree of accuracy and within a certain range. When selecting a measuring tool, make sure it is applicable to the task.

As with all tools, measuring tools provide the best results if they are cared for properly. Improper use can damage the tool and result in inaccurate results. If any measurement is questionable, verify the measurement using another tool. A standard gauge is usually provided with measuring tools to check accuracy and calibrate the tool if necessary.

Precision measurements can vary according to the experience of the person taking the measurement. Accurate results are only possible if the mechanic pos-

sesses a feel for using the tool. Heavy-handed use of measuring tools produces less accurate results than if the tool is handled properly. Grasp precision measuring tools gently between fingertips so the point at which the tool contacts the object is easily felt. This feel for the equipment produces consistently accurate measurements and reduces the risk of damaging the tool or component. Refer to the following sections for a description of various measuring tools.

Feeler Gauge

The feeler or thickness gauge (**Figure 26**) is used for measuring the distance between two surfaces.

A feeler gauge set consists of an assortment of steel strips of graduated thicknesses. Each blade is marked with its thickness. Blades can be of various lengths and angles for different procedures.

A common use for a feeler gauge is to measure piston ring end gap. Wire (round) type gauges are used to measure spark plug gap.

Calipers

Calipers (**Figure 27**) are excellent tools for obtaining inside, outside and depth measurements. Al-

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